

SEQUENCE LISTING

<110> Novak, Rodger
Toumanen, Elaine I.

<120> NOVEL ANTIBIOTICS AND METHODS OF USING THE SAME

<130> 1340-1-016 N

<140> UNASSIGNED
<141> 1999-05-05

<150> 09/073,541
<151> 1998-05-06

<160> 54

<170> PatentIn Ver. 2.0

<210> 1
<211> 75
<212> DNA
<213> bacterial

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gcaagagact ataat 75

<210> 2
<211> 25
<212> PRT
<213> bacterial

<400> 2
Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln Leu Leu Ala
1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Tyr Asn
20 25

<210> 3
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:primer

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<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:primer

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1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Tyr Asn
20 25

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<213> Artificial Sequence

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<223> Description of Artificial Sequence:primer

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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:primer

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Asp Lys Arg Pro Ala Arg Asp Ala Asn
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<212> DNA
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42

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<213> bacterial

<400> 8
Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln Leu
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<212> DNA
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33

<210> 10
<211> 11
<212> PRT
<213> bacterial

<400> 10
Leu Ala Asp Lys Arg Pro Ala Arg Asp Tyr Asn
1 5 10

<210> 11
<211> 84
<212> DNA
<213> bacterial

<400> 11
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aaaaggccag caagagacta taat 84

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<211> 28

<212> PRT
<213> bacterial

<400> 12

Met Glu Phe Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln
1 5 10 15

Leu Leu Ala Asp Lys Arg Pro Ala Arg Asp Tyr Asn
20 25

<210> 13

<211> 1329

<212> DNA

<213> bacterial

<400> 13

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aggcagagta tcgagcaagt gttagacttg tattcccaga ctagtgatata caaggggacc 240
gtcaaagggtg agatgaccga ggacaagtttta gaagtcaagg acagtcttcc tctggacaca 300
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<210> 14

<211> 442

<212> PRT

<213> bacterial

<400> 14

Met Lys Arg Thr Gly Leu Phe Ala Lys Ile Phe Ile Tyr Thr Phe Ser

1

5

10

15

Ile Phe Ser Val Leu Val Ile Cys Leu His Leu Ala Ile Tyr Phe Leu
20 25 30

Phe Pro Ser Thr Tyr Leu Ser His Arg Gln Glu Thr Ile Gly Gln Lys
35 40 45

Ala Thr Ala Ile Ala Gln Ser Leu Glu Gly Lys Asp Arg Gln Ser Ile
50 55 60

Glu Gln Val Leu Asp Leu Tyr Ser Gln Thr Ser Asp Ile Lys Gly Thr
65 70 75 80

Val Lys Gly Glu Met Thr Glu Asp Lys Leu Glu Val Lys Asp Ser Leu
85 90 95

Pro Leu Asp Thr Asp Arg Gln Thr Thr Ser Leu Phe Ile Glu Glu Arg
100 105 110

Glu Val Lys Thr Gln Asp Gly Gly Thr Met Ile Leu Gln Phe Leu Ala
115 120 125

Ser Met Asp Leu Gln Lys Glu Ala Glu Gln Ile Ser Leu Gln Phe Leu
130 135 140

Pro Tyr Thr Leu Leu Ala Ser Phe Leu Ile Ser Leu Leu Val Ala Tyr
145 150 155 160

Ile Tyr Ala Arg Thr Ile Val Ala Pro Ile Leu Glu Ile Lys Arg Val
165 170 175

Thr Arg Arg Met Met Asp Leu Asp Ser Gln Val Arg Leu Arg Val Asp
180 185 190

Ser Lys Asp Glu Ile Gly Asn Leu Lys Glu Gln Ile Asn Ser Leu Tyr
195 200 205

Gln His Leu Leu Thr Val Ile Ala Asp Leu His Glu Lys Asn Glu Ala
210 215 220

Ile Leu Gln Leu Glu Lys Met Lys Val Glu Phe Leu Arg Gly Ala Ser
225 230 235 240

His Glu Leu Lys Thr Pro Leu Ala Ser Leu Lys Ile Leu Ile Glu Asn
245 250 255

Met Arg Glu Asn Ile Gly Arg Tyr Lys Asp Arg Asp Gln Tyr Leu Gly

260

265

270

Val Ala Leu Gly Ile Val Asp Glu Leu Asn His His Val Leu Gln Ile
275 280 285

Leu Ser Leu Ser Ser Val Gln Glu Leu Arg Asp Asp Arg Glu Thr Ile
290 295 300

Asp Leu Leu Gln Met Thr Gln Asn Leu Val Lys Asp Tyr Ala Leu Leu
305 310 315 320

Ala Lys Glu Arg Glu Leu Gln Ile Asp Asn Ser Leu Thr His Gln Gln
325 330 335

Ala Tyr Leu Asn Pro Ser Val Met Lys Leu Ile Leu Ser Asn Leu Ile
340 345 350

Ser Asn Ala Ile Lys His Ser Val Pro Gly Gly Leu Val Arg Ile Gly
355 360 365

Glu Arg Glu Gly Glu Leu Phe Ile Glu Asn Ser Cys Ser Ser Glu Glu
370 375 380

Gln Glu Lys Leu Ala Gln Ser Phe Ser Asp Asn Ala Ser Arg Lys Val
385 390 395 400

Lys Gly Ser Gly Met Gly Leu Phe Val Val Lys Ser Leu Leu Glu His
405 410 415

Glu Lys Leu Ala Tyr Arg Phe Glu Met Glu Glu Asn Ser Leu Thr Phe
420 425 430

Phe Ile Asp Phe Pro Lys Val Val Gln Asp
435 440

<210> 15

<211> 657

<212> DNA

<213> bacterial

<400> 15

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tctagctatg aggtggccct ggtttactg gatatccaga tgcccaagct caacggctta 180
gaagtcctag ctgagattcg taaaaccagt caggttcctg tcttgatgtt gacagcttt 240
caagatgagg aataacaagat gagtgccctt gcctctttgg cagatggcta tctggaaaaa 300
ccttctcccc tctccctttt aaaagtgagg gtggacgcga ttttcaagcg ctactacgat 360

acaggacgaa tctttctta caaggatacc aagggtggact ttgaaagcta cagtgcacg 420
ctcgaggtc aagaagtgc tatcaatgcc aaagagttgg aaattctgga ctatctatg 480
aaaaatgaag gccgggcctt gactcgatct cagattatcg atgccgtctg gaaagcgaca 540
gatgaggttc ccttgaccg tgttattgtatca aggaattgcg gaaaaagcta 600
gacttggatt gtatcctcac tgtgcgcaat gttggttata aattggagcg aaaaatga 657

<210> 16
<211> 218
<212> PRT
<213> bacterial

<400> 16

Met	Lys	Ile	Leu	Ile	Val	Glu	Asp	Glu	Glu	Met	Ile	Arg	Glu	Gly	Val
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Ser Asp Tyr Leu Thr Asp Cys Gly Tyr Glu Thr Ile Glu Ala Ala Asp
20 25 30

Gly Gln Glu Ala Leu Glu Gln Phe Ser Ser Tyr Glu Val Ala Leu Val
35 40 45

Leu Leu Asp Ile Gln Met Pro Lys Leu Asn Gly Leu Glu Val Leu Ala
50 55 60

Glu Ile Arg Lys Thr Ser Gln Val Pro Val Leu Met Leu Thr Ala Phe
65 70 75 80

Gln Asp Glu Glu Tyr Lys Met Ser Ala Phe Ala Ser Leu Ala Asp Gly
85 90 95

Tyr Leu Glu Lys Pro Phe Ser Leu Ser Leu Leu Lys Val Arg Val Asp
100 105 110

Ala Ile Phe Lys Arg Tyr Tyr Asp Thr Gly Arg Ile Phe Ser Tyr Lys
115 120 125

Asp Thr Lys Val Asp Phe Glu Ser Tyr Ser Ala Ser Leu Ala Gly Gln
130 135 140

Glu Val Pro Ile Asn Ala Lys Glu Leu Glu Ile Leu Asp Tyr Leu Val
145 150 155 160

Lys Asn Glu Gly Arg Ala Leu Thr Arg Ser Gln Ile Ile Asp Ala Val
165 170 175

Trp Lys Ala Thr Asp Glu Val Pro Phe Asp Arg Val Ile Asp Val Tyr
180 185 190

Ile Lys Glu Leu Arg Lys Lys Leu Asp Leu Asp Cys Ile Leu Thr Val
195 200 205

Arg Asn Val Gly Tyr Lys Leu Glu Arg Lys
210 215

<210> 17
<211> 648
<212> DNA
<213> bacterial

<400> 17
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ggagcaggaa aatccacact cttgtcccta cttgctggtc tagatagtcc tggtaaggt 180
tctatcctt ttcaaggaga ggatattcgt aagaagggtt attcttacca tcgcac 240
catatccc tggctttca aaattataac ttgatagatt atcttctcc gctggaaaat 300
atccgattgg tcaacaaaaa ggcaagcaag aatacacttc ttgagcttgg tttggatgaa 360
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gctcgagtt tggctcaga agctccagttt attctagctg atgagccaac agggaaatctg 480
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aaatgtgtga ttgtcgtaac tcacagtaaa gaagtggcac aagcgtcaga tattacactt 600
gaattaaagg ataagaaact gactgaaacg cgcaacta gttaataa 648

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<211> 215
<212> PRT
<213> bacterial

<400> 18
Met Thr Leu Leu Gln Leu Gln Asp Val Thr Tyr Arg Tyr Lys Asn Thr
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Ala Glu Ala Val Leu Tyr Gln Ile Asn Tyr Asn Phe Glu Pro Gly Lys
20 25 30

Phe Tyr Ser Ile Ile Gly Glu Ser Gly Ala Gly Lys Ser Thr Leu Leu
35 40 45

Ser Leu Leu Ala Gly Leu Asp Ser Pro Val Glu Gly Ser Ile Leu Phe
50 55 60

Gln Gly Glu Asp Ile Arg Lys Lys Gly Tyr Ser Tyr His Arg Met His
65 70 75 80

His Ile Ser Leu Val Phe Gln Asn Tyr Asn Leu Ile Asp Tyr Leu Ser
85 90 95

Pro Leu Glu Asn Ile Arg Leu Val Asn Lys Lys Ala Ser Lys Asn Thr
100 105 110

Leu Leu Glu Leu Gly Leu Asp Glu Ser Gln Ile Lys Arg Asn Val Leu
115 120 125

Gln Leu Ser Gly Gly Gln Gln Arg Val Ala Ile Ala Arg Ser Leu
130 135 140

Val Ser Glu Ala Pro Val Ile Leu Ala Asp Glu Pro Thr Gly Asn Leu
145 150 155 160

Asp Pro Lys Thr Ala Gly Asp Ile Val Glu Leu Leu Lys Ser Leu Ala
165 170 175

Gln Lys Thr Gly Lys Cys Val Ile Val Val Thr His Ser Lys Glu Val
180 185 190

Ala Gln Ala Ser Asp Ile Thr Leu Glu Leu Lys Asp Lys Lys Leu Thr
195 200 205

Glu Thr Arg Asn Thr Ser Lys
210 215

<210> 19

<211> 1380

<212> DNA

<213> bacterial

<400> 19

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<211> 459
<212> PRT
<213> bacterial

<400> 20

Met Leu His Asn Ala Phe Ala Tyr Val Thr Arg Lys Phe Phe Lys Ser
1 5 10 15

Ile Val Ile Phe Leu Ile Leu Leu Met Ala Ser Leu Ser Leu Val
20 25 30

Gly Leu Ser Ile Lys Gly Ala Thr Ala Lys Ala Ser Gln Glu Thr Phe
35 40 45

Lys Asn Ile Thr Asn Ser Phe Ser Met Gln Ile Asn Arg Arg Val Asn
50 55 60

Gln Gly Thr Pro Arg Gly Ala Gly Asn Ile Lys Gly Glu Asp Ile Lys
65 70 75 80

Lys Ile Thr Glu Asn Lys Ala Ile Glu Ser Tyr Val Lys Arg Ile Asn
85 90 95

Ala Ile Gly Asp Leu Thr Gly Tyr Asp Leu Ile Glu Thr Pro Glu Thr
100 105 110

Lys Lys Asn Leu Thr Ala Asp Arg Ala Lys Arg Phe Gly Ser Ser Leu
115 120 125

Met Ile Thr Gly Val Asn Asp Ser Ser Lys Glu Asp Lys Phe Val Ser
130 135 140

Gly Ser Tyr Lys Leu Val Glu Gly Glu His Leu Thr Asn Asp Asp Lys
145 150 155 160

Asp Lys Ile Leu Leu His Lys Asp Leu Ala Ala Lys His Gly Trp Lys
165 170 175

Val Gly Asp Lys Val Lys Leu Asp Ser Asn Ile Tyr Asp Ala Asp Asn

180

185

190

Glu Lys Gly Ala Lys Glu Thr Val Glu Val Thr Ile Lys Gly Leu Phe
195 200 205

Asp Gly His Asn Lys Ser Ala Val Thr Tyr Ser Gln Glu Leu Tyr Glu
210 215 220

Asn Thr Ala Ile Thr Asp Ile His Thr Ala Ala Lys Leu Tyr Gly Tyr
225 230 235 240

Thr Glu Asp Thr Ala Ile Tyr Gly Asp Ala Thr Phe Phe Val Thr Ala
245 250 255

Asp Lys Asn Leu Asp Asp Val Met Lys Glu Leu Asn Gly Ile Ser Gly
260 265 270

Ile Asn Trp Lys Ser Tyr Thr Leu Val Lys Ser Ser Ser Asn Tyr Pro
275 280 285

Ala Leu Glu Gln Ser Ile Ser Gly Met Tyr Lys Met Ala Asn Leu Leu
290 295 300

Phe Trp Gly Ser Leu Ser Phe Ser Val Leu Leu Leu Ala Leu Leu Leu
305 310 315 320

Ser Leu Trp Ile Asn Ala Arg Arg Lys Glu Val Gly Ile Leu Leu Ser
325 330 335

Ile Gly Leu Lys Gln Ala Ser Ile Leu Gly Gln Phe Ile Thr Glu Ser
340 345 350

Ile Leu Ile Ala Ile Pro Ala Leu Val Ser Ala Tyr Phe Leu Ala Asn
355 360 365

Tyr Thr Ala Arg Ala Ile Gly Asn Thr Val Leu Ala Asn Val Thr Ser
370 375 380

Gly Val Ala Lys Gln Ala Ser Lys Ala Ala Gln Ala Ser Asn Leu Gly
385 390 395 400

Gly Gly Ala Glu Val Asp Gly Phe Ser Lys Thr Leu Ser Ser Leu Asp
405 410 415

Ile Ser Ile Gln Thr Ser Asp Phe Ile Ile Ile Phe Val Leu Ala Leu
420 425 430

Val Leu Val Val Leu Val Met Ala Leu Ala Ser Ser Asn Leu Leu Arg

435

440

445

Lys Gln Pro Lys Glu Leu Leu Leu Asp Gly Glu
450 455

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<211> 1278
<212> DNA
<213> bacterial

<400> 21
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<210> 22
<211> 425
<212> PRT
<213> bacterial

<400> 22
Met Asn Pro Ile Gln Arg Ser Trp Ala Tyr Val Ser Arg Lys Arg Leu
1 5 10 15

Arg Ser Phe Ile Leu Phe Leu Ile Leu Leu Val Leu Leu Ala Gly Ile
20 25 30

Ser Ala Cys Leu Thr Leu Met Lys Ser Asn Lys Thr Val Glu Ser Asn

35

40

45

Leu Tyr Lys Ser Leu Asn Thr Ser Phe Ser Ile Lys Lys Ile Glu Asn
 50 55 60

Gly Gln Thr Phe Lys Leu Ser Asp Leu Ala Ser Val Ser Lys Ile Lys
 65 70 75 80

Gly Leu Glu Asn Val Ser Pro Glu Leu Glu Thr Val Ala Lys Leu Lys
 85 90 95

Asp Lys Glu Ala Val Thr Gly Glu Gln Ser Val Glu Arg Asp Asp Leu
 100 105 110

Ser Ala Ala Asp Asn Asn Leu Val Ser Leu Thr Ala Leu Glu Asp Ser
 115 120 125

Ser Lys Asp Val Thr Phe Thr Ser Ser Ala Phe Asn Leu Lys Glu Gly
 130 135 140

Arg His Leu Gln Lys Gly Asp Ser Lys Lys Ile Leu Ile His Glu Glu
 145 150 155 160

Leu Ala Lys Lys Asn Gly Leu Ser Leu His Asp Lys Ile Gly Leu Asp
 165 170 175

Ala Gly Gln Ser Glu Ser Gly Lys Gly Gln Thr Val Glu Phe Glu Ile
 180 185 190

Ile Gly Ile Phe Ser Gly Lys Lys Gln Glu Lys Phe Thr Gly Leu Ser
 195 200 205

Ser Asp Phe Ser Glu Asn Gln Val Phe Thr Asp Tyr Glu Ser Ser Gln
 210 215 220

Thr Leu Leu Gly Asn Ser Glu Ala Gln Val Ser Ala Ala Arg Phe Tyr
 225 230 235 240

Val Glu Asn Pro Lys Glu Met Asp Gly Leu Met Lys Gln Val Glu Asn
 245 250 255

Leu Ala Leu Glu Asn Gln Gly Tyr Gln Val Glu Lys Glu Asn Lys Ala
 260 265 270

Phe Glu Gln Ile Lys Asp Ser Val Ala Thr Phe Gln Thr Phe Leu Thr
 275 280 285

Ile Phe Leu Tyr Gly Met Leu Ile Ala Gly Ala Gly Ala Leu Ile Leu

290

295

300

Val Leu Ser Leu Trp Leu Arg Glu Arg Val Tyr Glu Val Gly Ile Leu
305 310 315 320

Leu Ala Leu Gly Lys Gly Lys Ser Ser Ile Phe Leu Gln Phe Cys Leu
325 330 335

Glu Val Val Leu Val Ser Leu Gly Ala Leu Leu Pro Ala Phe Val Ala
340 345 350

Gly Asn Ala Ile Thr Thr Tyr Leu Leu Gln Thr Leu Leu Ala Ser Gly
355 360 365

Asp Gln Ala Ser Leu Gln Asp Thr Leu Ala Lys Ala Ser Ser Leu Ser
370 375 380

Thr Ser Ile Leu Ser Phe Ala Glu Ser Tyr Val Phe Leu Val Leu Leu
385 390 395 400

Ser Cys Leu Ser Val Ala Leu Cys Phe Leu Phe Leu Phe Arg Lys Ser
405 410 415

Pro Lys Glu Ile Leu Ser Ser Ile Ser
420 425

<210> 23

<211> 1407

<212> DNA

<213> bacterial

<400> 23

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tctattaaga agatagagaa tggtcagaca ttcaagttgt cagaccttagc atctgtaagc 360
aagattaagg ggctggaaaa tgccttcctt gaacttgaga cggtcgcaaa actaaaaagac 420
aaggaagcag tgactggcga gcagagcgtg gagcgtgatg atttatcagc tgcagacaat 480
aacttggta gcttaacggc tcttgaggat tcatccaagg atgtaacctt taccagttcg 540
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<400> 24

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Ser	Ala	Ala	Asp	Asn	Asn	Leu	Val	Ser	Leu	Thr	Ala	Leu	Glu	Asp	Ser
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Ala Gly Gln Ser Glu Ser Gly Lys Gly Gln Thr Val Glu Phe Glu Ile
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Ile Gly Ile Phe Ser Gly Lys Lys Gln Glu Lys Phe Thr Gly Leu Ser
195 200 205

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210 215 220

Thr Leu Leu Gly Asn Ser Glu Ala Gln Val Ser Ala Ala Arg Phe Tyr
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Val Glu Asn Pro Lys Glu Met Asp Gly Leu Met Lys Gln Val Glu Asn
245 250 255

Leu Ala Leu Glu Asn Gln Gly Tyr Gln Val Glu Lys Glu Asn Lys Ala
260 265 270

Phe Glu Gln Ile Lys Asp Ser Val Ala Thr Phe Gln Thr Phe Leu Thr
275 280 285

Ile Phe Leu Tyr Gly Met Leu Ile Ala Gly Ala Gly Ala Leu Ile Leu
290 295 300

Val Leu Ser Leu Trp Leu Arg Glu Arg Val Tyr Glu Val Gly Ile Leu
305 310 315 320

Leu Ala Leu Gly Lys Gly Lys Ser Ser Ile Phe Leu Gln Phe Cys Leu
325 330 335

Glu Val Val Leu Val Ser Leu Gly Ala Leu Leu Pro Ala Phe Val Ala
340 345 350

Gly Asn Ala Ile Thr Thr Tyr Leu Leu Gln Thr Leu Ala Ser Gly
355 360 365

Asp Gln Ala Ser Leu Gln Asp Thr Leu Ala Lys Ala Ser Ser Leu Ser
370 375 380

Thr Ser Ile Leu Ser Phe Ala Glu Ser Tyr Val Phe Leu Val Leu Leu
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Pro Lys Glu Ile Leu Ser Ser Ile Ser
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<211> 8900
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<213> bacterial

<400> 25

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<211> 25
<212> PRT
<213> bacterial

<400> 26
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Met Glu Arg Pro Trp Cys Ser Leu Val
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<210> 27
<211> 25
<212> PRT
<213> bacterial

<400> 27
Ser Ser Leu Leu Asp Gly Val Lys Ile Ala Ser Gly Asn Leu Leu Ala
1 5 10 15

Ser Thr Lys Pro Ser Gly Asn Phe Asn
20 25

<210> 28
<211> 25
<212> PRT
<213> bacterial

<400> 28
Ser Arg Lys Arg Phe His Gln Ile Leu Met Gln Gly Met Lys Leu Ala
1 5 10 15

Tyr Arg Ile Tyr Arg Ser Ser His Asp
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<210> 29
<211> 25
<212> PRT
<213> bacterial

<400> 29
Arg Ser Asp Lys Phe His Ser Thr Ile Val Leu Ser Ser Val Leu Ala
1 5 10 15

Asp Lys Lys Thr Pro Arg Cys Cys His
20 25

<210> 30
<211> 25
<212> PRT
<213> bacterial

<400> 30
His Val Glu Glu Leu His His Val Val Glu Ser Leu Ala Leu Leu Ser
1 5 10 15

Asp Lys Val Leu Cys Arg Asn Ser Tyr
20 25

<210> 31
<211> 25
<212> PRT
<213> bacterial

<400> 31
Thr Gly Arg Glu Ala Arg Arg Ile Ile Ser Ala Gly Glu Ile Leu Val
1 5 10 15

Asp Gly Val Val Arg Lys Asp Tyr Lys
20 25

<210> 32
<211> 25
<212> PRT
<213> bacterial

<400> 32

Arg Cys Leu Arg Arg Asp Ser Leu Phe Ser Ser Gly Cys Leu Leu Ala
1 5 10 15

Gly Glu Glu Pro Ser Arg Arg Ser Cys
20 25

<210> 33

<211> 25

<212> PRT

<213> bacterial

<400> 33

Val Leu Arg Thr His Gly Thr Val Leu Ser Ala Lys Gln Leu Ile Asn
1 5 10 15

Ala Lys Asn Pro Ser Arg Tyr Phe Gly
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<210> 34

<211> 20

<212> PRT

<213> bacterial

<400> 34

Leu Lys Glu Glu Phe Glu Lys Phe Arg Ser Ala Gly Glu Lys Leu Leu
1 5 10 15

Asp Phe Arg Pro
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<210> 35

<211> 12

<212> PRT

<213> bacterial

<400> 35

Phe Gly Asn Gln Leu Ser Ile Gly Gln Leu Ile Ala
1 5 10

<210> 36

<211> 25

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer

<400> 36

Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln Leu Leu Ala
1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Xaa Asn
20 25

<210> 37

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer

<400> 37

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23

<210> 38

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer

<400> 38

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21

<210> 39

<211> 23

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer

<400> 39

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1 5 10 15

Lys Arg Pro Xaa Arg Asp Tyr

<210> 40
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<212> PRT
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<220>
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<400> 40
Asp Lys Arg Pro Ala Arg Asp Tyr
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<210> 41
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
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<400> 41
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<210> 42
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
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<400> 42
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<210> 43
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<213> Artificial Sequence

<220>

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<400> 43

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Xaa Xaa Xaa Xaa Ala Xaa Xaa Xaa Asn
20 25

<210> 44

<211> 27

<212> PRT

<213> bacterial

<400> 44

Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln Leu Leu Ala
1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Tyr Asn Arg Lys
20 25

<210> 45

<211> 312

<212> DNA

<213> bacterial

<400> 45

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agcagttaaa gt 312

<210> 46

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer

<400> 46

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<210> 47

<211> 27
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<220>
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<400> 47
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1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Tyr Asn Arg Lys
20 25

<210> 48
<211> 30
<212> PRT
<213> bacterial

<400> 48
Met Glu Phe Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln
1 5 10 15

Leu Leu Ala Asp Lys Arg Pro Ala Arg Asp Tyr Asn Arg Lys
20 25 30

<210> 49
<211> 26
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<220>
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<400> 49
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<210> 50
<211> 20
<212> DNA
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<220>
<223> Description of Artificial Sequence:primer

<400> 50

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20

<210> 51
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:primer

<400> 51
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23

<210> 52
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:primer

<400> 52
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25

<210> 53
<211> 81
<212> DNA
<213> bacterial

<400> 53
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gcaagagact ataatagaaa a 81

<210> 54
<211> 90
<212> DNA
<213> bacterial

<400> 54
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aaaagg~~cc~~ag caagagacta taatagaaaa 90